

KUCHNER, V.F.; FLENNEL', S.Ya.

Macromolecular configuration of single chain globular proteins in
spiraling solvents. Biokhimiya 27 no.6:1111-1115 M-D '62.
(MIRA 17:5)

1. Institut tsitologii i Institut vysokomolekulyarnykh soyedineniy
AN SSSR, Leningrad.

BRESLER, S.Ye.; MARSHAL', Zh. ; PYRKOV, L.M.; FREMKEL', S.Ya.

Study of selective solvation by sedimentation in a density gradient.
Vysokom.soed. 5 no.7:1101-1105 Л '63. (MIRA 16:9)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.
(Polymers) (Solvation) (Sedimentation analysis)

BRESLER, S.Ye.; PYRKOV, L.M.; FRENKEL', S.Ya.

Sedimentation of graft copolymers in a density gradient. Approach
to equilibrium, selective solvation, and polydispersity of composition.
Vysokom.soed. 5 no.9:1315-1320 S '63. (MIRA 17:1)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.

SHALTYKO, L.G.; BARANOV, V.G.; VOLKOV, T.I.; LUTSENKO, V.V.;
FRENKEL', S.Ya.

Theory of heterophase polymerization. Part 2: Comparison
of molecular weight distributions of polymers obtained under
conditions of homophase and heterophase polymerization.
Vysokom. soed. 5 no.10:1527-1533 0 '63. (MIRA 17:1)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR i
Vsesoyuznyy nauchno-issledovatel'skiy institut sinteticheskikh
volokon.

FRENKEL', S.Ya.; LYUBETSKIY, S.G.; SHALTYKO, L.G.

Contribution to the theory of heterophase polymerization. Part 3:
Heterophase polymerization with the precipitation of the polymer
formed as a continuous deposit. Vysokom.soed. 5 no.11:1620-1626 N
'63. (MIRA 17:1)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.

FRENKEL', S.Ya.; KUSHNER, V.P.

Analysis of factors affecting the sharpness of the helix-globule transition in globular proteins. Blokhimiia 28 no.3:535-539 My-Je '63.
(MIRA 17:2)

1. Institute of High-Molecular Compounds, and Institute of Cytology,
Academy of Sciences of the U.S.S.R., Leningrad.

S/074/63/032/003/001/002
A057/1126

AUTHORS: P,rrkov, L.M., Frenkel', S.Ya.

TITLE: Secondary reactions of the radical polymerization

PERIODICAL: Uspekhi khimii, v. 32, no. 3, 1963, 305 - 335

TEXT: A systematic discussion is given of the current information on secondary reactions in radical polymerization. Secondary reactions are defined by the present authors as: transformation of "dead" chains and macroradicals which occur in later stages of polymerization and start with the activations of intermediate links by a transfer of a chain to the polymer. The occurrence of secondary reactions can be studied only in some model systems where the single reactions can be "isolated". These separate types of reactions are discussed after introductory remarks in the present paper. The last chapter deals with methods for the registration and investigation of secondary reactions in model systems. Oxidation destruction of polymers is not discussed in the analysis of the secondary reaction - destruction of polymer chains. Another secondary reaction is the interchain exchange effected by: 1) macromolecular combination; 2) multiple

Card 1/3

Secondary reactions of the radical polymerization

S/074/63/032/003/001/002
A057/A126

destruction acts; and 3) the proper interchain exchange. The third secondary reaction discussed is the transfer of the kinetic chain to the polymer with subsequent growth of the side chain, which may occur with intermolecular transfer of the active center if the radical at the end attacks the methylene group of the same molecule (high-pressure polyethylene). Crosslinking of the macromolecule occurs in linear polymerization as secondary reaction at a shortage of the monomer, or at a relative high quantity of macroradicals. Intensive crosslinking with interchain exchange occurs in ω -polymerization. Three types of macroradical-recombination are assumed: head to head, head to side, and side to side. The most suitable method for determining secondary reactions is the determination of the distribution of molecular weight. Destruction can be controlled by measuring the viscosity, while determination of interchain exchange can be done by means of the distribution of molecular weight. The latter is also applicable to the control of the transfer of a kinetic chain to the polymer and the crosslinking of macromolecules. However, for investigations of secondary reactions model systems are more convenient in which reaction occurs more or less on its own. Isotope-tracer techniques are suitable for investigations of interchain exchange processes. For the study of the transfer of a kinetic chain the method of

Card 2/3

Secondary reactions of the radical polymerization

S/074/63/032/003/001/002
A057/A126

G. Henrici-Olive, and S. Olive (J. Polymer Sci., v. 17, 1955, 45) is especially suitable. The most reliable determination of crosslinking is carried out by the measurement of distribution of molecular weight and "hybride polymers" prepared like in determining interchain exchange. Infra-red analysis, and sol-gel analysis may be used for investigations of secondary reactions in diene polymerization. There are 15 figures.

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad (Institute of High-Molecular Compounds of the AS USSR, Leningrad)

Card 3/3

L 18408-63 EWP(j)/EWT(m)/BDS AFFTC/ASD Pc-4 RM/MAY
ACCESSION NR: AP3006186 S/0080/63/036/007/1587/1591

65
62

AUTHORS: Afanas'yeva, G. N.; Vol'f, L. A.; Meos, A. I.;
Slutsker, A. I.; Frenkel', S. Ya.

TITLE: Analysis of the orientation of highly-ordered regions in
strengthened fibers prepared from polyvinyl alcohol. 15

SOURCE: Zhurnal prikladnoy khimii, v. 36, no. 7, 1963, 1587-1591

TOPIC TAGS: high-temperature extrusion, plastics, X-ray diffraction

ABSTRACT: Authors studied the orientation of hardened fibers and compared the obtained results with freshly prepared and untreated fibers. They hoped by this to either prove or disprove the effect of hydrogen bonding and the orientation on the rigidity and solubility of these fibers in water which were prepared from polyvinyl alcohol. The orientation of highly aligned crystallites were evaluated by X-ray diffraction by both a photographic method and ionization registration method. It was shown that the analyzed polyvinyl alcohol fibers are highly crystalline and that the crystallites are

Card 1/2

L 18408-63

ACCESSION NR: AP3006186

3

oriented around the fiber axis or C-axis of its elemental cells. Thus, the results of X-ray diffraction analysis showed that, during thermoplastication stretching, some structural changes take place, resulting in a considerable increase of crystallite orientation as well as of rigidity. Orig. art. has: 1 table and 4 figures.

ASSOCIATION: Leningradskiy tekstil'nyy institut imeni S. M. Kirova (Leningrad textile institute), Institut vy*sokomolekulyarny*kh soy-edineniy, AN, SSSR (Institute of high-molecular compounds, AS, SSSR), Leningradskiy fiziko-tekhnicheskiy institut imeni A. F. Ioffe, AN, SSSR. (Leningrad physics-engineering institute)

SUBMITTED: 19Dec62

DATE ACQ: 25Sep63

ENCL: 00

SUB CODE: CH, MA

NO REF SOV: 004

OTHER: 002

Card 2/2

TSVETKOV, V.N.; ESKIN, V.Ye.; FRENKEL', S.Ya.; CHEBOTAREVA, A.V.,
red.

[Structure of macromolecules in solutions] Struktura makromolekul v rastvorakh. Moskva, Nauka, 1964. 719 p.
(MIRA 18:2)

PANOV, Yu.N.; NORDBEK, K.Ye.; FRENKEL', S.Ya.

Selective interaction in polymer chains. Part 3: Fluctuational
amorphous network in solution of polymers capable of interchain
hydrogen bonding. Vysokom. soed. 6 no.1:47-51 Ja'64.

(MIRA 17:5)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.

MEN'SHOV, V.M.; FRENKEL', S.Ya.

Effect of polydispersity on the molecular weight values calculated on the basis of the Flory-Mandelkern invariant. *Vysokom.soed.* 6 no.2:206-212 F '64. (MIRA 17:2)

1. Institut organicheskoy khimii AN SSSR, Kazan' i Institut vysokomolekulyarnykh soyedineniy AN SSSR.

L 00784-65 INT(m)/EPP(c)/ENP(j) Pg-4/Pr-4 AFWL/AEDX(a)/ASD(f)-3/ASD(p)-3/
AFETR RM
ACCESSION NR: AFJ003798 S/0190/64/006/008/1420/1425

AUTHOR: Frenkel', S. Ya.; Klenin, S. I.

TITLE: Hydrodynamic properties of polycarbethoxyphenylmethacrylamides. III 7 B

SOURCE: Vysokomolekulyarnyye soedineniya, v. 6, no. 8, 1964, 1420-1425

TOPIC TAGS: macromolecular chemistry, hydrodynamics, amide

ABSTRACT: Previous investigations of one of the authors /Frenkel'7 revealed anomalies in the hydrodynamic behavior of p-polycarbethoxyphenylmethacrylamide in such solvents as ethyl acetate and methylformamide, which were explained at that time by the development of structural rigidity in the macromolecules of this compound, giving rise to the possibility of the formation of intrachain hydrogen bonds between the amide groups or amide hydrogen and the carbonyl oxygen of the carbethoxy group. In the light of later studies indicating the impossibility of the formation of helical macromolecules, a new study was made of this compound, using four different methods: sedimentation, diffusion, viscosimetry, and light scattering. Measurements of the sedimentation, diffusion, and intrinsic viscosity in dimethylformamide and ethyl acetate confirmed the anomaly of

Card 1/3

L 20784-65

ACCESSION NR: A15003798

the hydrodynamic properties of p-polycarbethoxyphenylmethacrylamide in these solvents, manifested in deviations from the classical ratios between the hydrodynamic characteristics and the molecular weight. The authors explain the anomaly by a progressive increase in the structural rigidity of the macromolecules with increasing molecular weight above a certain critical value M (of the order of 10^6), as a result of the formation of a system of intrachain hydrogen bonds, producing a semirigid model with internal loops and macrocycles. Consecutive addition of completed external macrocycles is manifested in the tendency toward increasing asymmetry of the coils with increasing molecular weight. Below the critical molecular weight, corresponding to incomplete macrocyclic configurations, pronounced polydispersion of the shape is manifested, leading to a discrepancy between the average molecular weights determined by different methods, while above the critical value, asymmetric configurations predominate, with a corresponding anomalous increase in the hydrodynamic interactions. In "active" solvents, competing with the polymer for hydrogen bonds, or in α -polycarbethoxyphenylmethacrylamide, where there are no intrachain hydrogen bonds, the anomaly of the hydrodynamic properties disappears. The results of this study are compared with the data of other authors, and the discrepancies are shown to be only apparent. Orig. art. has: 3 formulas, 3 graphs, 1 table.

Card 2/3

L 20784-65

ACCESSION NR: AP5003798

ASSOCIATION: Institut vysokomolekulyarnykh soedineniy AN SSSR (Institute of High-Molecular Compounds, AN SSSR)

SUBMITTED: 16Sep63

ENCL: 00

SUB CODE: 00, ME

NO REF S01: 009

OTHER: 003

JPRS

Card 3/3

PAVLOV, A.V.; AUDENIN, V.G.; FRANKEL', S.Ya.

Molecular weight distribution of mixed polyamides. *Vysokom. soed.* 6
no.9:1600-1604 S '64. (MIRA 17:10)

1. Institut elementoorganicheskikh soyedineniy AN SSSR i Institut
vysokomolekulyarnykh soyedineniy AN SSSR.

L 11351-55 EWT(m)/EPF(o)/EPR/EMP(j)/T Pc-4/Pr-4/Ps-4 RPL NW/RM

8/0190/64/006/010/1917/1917

ACCESSION NR: AP4047223

AUTHOR: Frankel', S. Ya.; Baranov, V. G.; Bel'nikovich, N. G.;
Panov, Yu. N. 6

TITLE: Orientation mechanism of solid-phase formation in polymer solutions subjected to a longitudinal hydrodynamic field 7

SOURCE: Vyssokomolekulyarnyye soyedineniya, v. 6, no. 10, 1964, 1917

TOPIC TAGS: solid phase formation, polymer solution, elongation, fiber formation, polymethyl methacrylate, fibroin

ABSTRACT: A new mechanism of solid phase formation in a liquid polymer-solution thread during orientation has been discovered. Liquid threads of 15% fibroin solution in water or 3% poly(methyl methacrylate) solution in dimethylformamide were stretched. In all cases, even with moderate elongations, there was irreversible solvent displacement from the thread, forming a slightly swollen fiber. It is suggested that the new mechanism is a primitive simulation of the formation process of natural silk and cobwebs. The mechanism may be of

Card 1/2

L 11351-65

ACCESSION NR: AP4047223

significance in gaining an understanding of the formation process of oriented polymer systems from solutions. Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 22Jun64

ATD PRESS: 313

ENCL: 00

SUB CODE: GC

NO REF SOV: 002

OTHER: 002

Card 2/2

PYRKOV, L.M.; GOLUBEV, V.M.; FRENKEL', S.Ya.

Some data on the hydration of globular proteins in concentrated solutions. Biokhimiia 29 no. 1:58-64 Ja-F '64. (MIRA 18:12)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad.
Submitted April 8, 1963.

FRANKEL', S.Ya., doktor fiz.-matem.nauk

Oriented state of polymers; conference in Leningrad. Vest. AN SSSR
34 no.9:131-135 S 1964.
(MIRA 17:10)

L 6636-65 EPA(s)-2/ENT(a)/EPF(a)/EPR/EMP(j)/T Pc-4/Pr-4/Ps-4/Pt-10/86
 FS-4 BSD/ASD(a)-5, WH/RM 82
 ACCESSION NR: AP4040527 S/0080/64/037/006/1349/1355
 AUTHOR: Afanas'yeva, G. N.; Bessonov, M. I.; Vol'f, I. A.; Meos, A. I.; Frenkel', S. Ya.

TITLE: Study of the thermomechanical properties¹⁵ of high strength polyvinylalcohol fibers by the isometric method

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 6, 1964, 1349-1355

TOPIC TAGS: polyvinylalcohol fiber, high strength fiber, isometric test method, thermomechanical property, thermally stabilized fiber, cord fiber, acetalated fiber, heat stretched fiber, fiber stretching, fiber shrinkage, elongation, chemically treated fiber, orientation, fiber orientation index

ABSTRACT: The physical and technological properties of high strength polyvinylalcohol (PVA) fibers obtained by thermally plasticized stretching at temperatures near the softening temperature were studied. Tests were run on an automatic apparatus provided with a highly sensitive compensating dynamometer, as described by A. P. Rudakov /Avtomatizirovanny'y dinamometr dlia ispy'taniya plenok i volokon i opy't ego ispol'zovaniya. (Automated dynamometer for testing films and fibers

Card 1/4

L 6636-65

ACCESSION NR: AP4040527

and testing of its applications), IX nauchnaya konferentsiya IVS AN SSSR 7. Tests were run in air and in inert atmosphere at different rates of heating on freshly formed fiber, on cord fiber, on fiber subjected to thermal stabilization and fiber acetalated with formaldehyde. The heat-formed stresses in rigidly fixed samples heated at 2.7 C/min. are shown in fig. 1. The low temperature maxima resulted from drying the fiber; the high temperature maxima are characteristic of the degree of fiber orientation. The magnitude of the stress at the maximum can serve as an index to the oriented state of the fiber. The hot-stretched fiber has the best indexes for the degree of orientation and also for modulus of elasticity, deformation and other parameters determining the performance of fibers in a wide temperature range. The untreated and chemically treated fibers do not show sharp maxima. The low values in the formaldehyde-treated fiber are indicated due to the limited segmental mobility of the macromolecules bound to the acetal bridges; the rise at 225-240C is due to the breaking of these bridges. At a greater rate of heating the maxima are shifted somewhat toward higher temperatures. The high strength fiber shows no deformation when subjected to small loads (1.76 kg/mm²) at regularly increased temperature, until the 200-220C range, where it actually shrinks. Shrinkage stops as the temperature approaches 240C, the softening point of the

Card 2/4

L 6636-65
ACCESSION NR: AP4040527

2
polymer. At higher loadings (5.27, 10.53 kg/mm²) the relaxation stresses of the fiber are exceeded at 80 and 600 causing some elongation, but the high strength fiber still retains most of its properties up to 180-190C. Orig. art. has: 5 figures.

ASSOCIATION: Leningradskiy tekstil'nyy institut imeni S. M. Kirova 1 (Leningrad Textile Institute); Institut vysokomolekul yamy*kh soyedineniy AN SSSR (Institute of Macromolecular Compounds)

SUBMITTED: 09 May 63

SUB CODE: MT

NO REF SOV: 007

INCL: 01

OTHER: 002

2/4

L 6636-55

ACCESSION NR: AP4040527

ENCLOSURE: 01

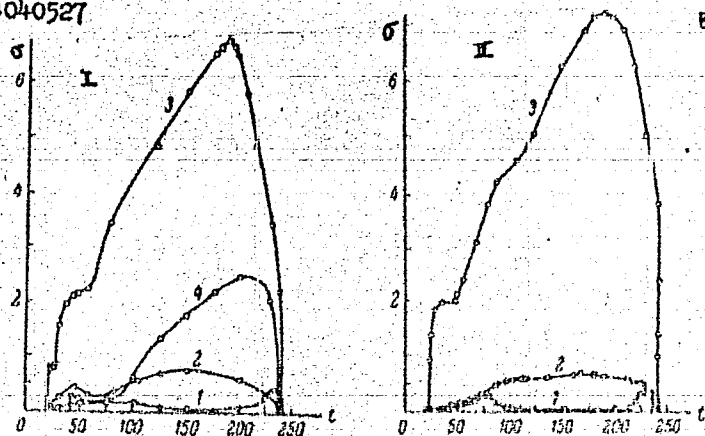


Fig. 1. Isometric curves for heating fiber in air (I) and in helium (II).
 t --temperature ($^{\circ}\text{C}$), σ --loading (kg/cm^2). Fiber: 1--reacted with formaldehyde;
 2--original (freshly prepared); 3--high strength; 4--cord fiber.

Card 4/4

ACCESSION NR: AP4043767

S/0080/64/037/008/1802/1807

AUTHOR: Py*rkov, L.M.; Korzhavin, L.N.; Sorokin, A.Ya.; Frenkel', S.Ya.

TITLE: Preparation of concentrated solutions and the removal of air in an atmosphere of solvent vapors

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 8, 1964, 1802-1807

TOPIC TAGS: solvent vapor, concentrated solution, polyvinyl alcohol, synthetic fiber, spinning, polyacrilonitrile, dimethylformamide, polymer

ABSTRACT: The authors describe a simple laboratory method for the removal of air from spinning solutions of polyvinyl alcohol (PVS) and polyacrilonitrile (PAN). This method can be easily adapted for other systems and technological conditions. Both solutions were prepared in a laboratory device. The initial components of the solution were introduced into a container which was placed inside a larger container filled with solvent and equipped with an electric heating element. The solution container was covered by an isolating glass cover. The cover had one opening for the introduction of nitrogen and another for a thermometer. The glass cover has a bottle neck which contains a bearing and a mixer with a waterproof seal. A nitrogen flux is injected during a period of 5-10 minutes. Then the solvent is poured into

Card 1/2

ACCESSION NR: AP4043767

the isolating cover and the nitrogen bubbles through it for a certain period of time. After that the entire system is heated to the required temperature while the water tight mixer stirs the solution without admitting air. A complete solution of PVS can be achieved after 60-70 minutes at 100°C. A partial removal of air from the solution takes place during this process and a structural homogeneity of the solution is achieved. Spinning solutions of PAN in dimethylformamide were prepared analogously at 60°C. Further removal of air from the solutions was carried out using a special suction device. The authors concluded that their air removal method can also be applied in the case of other polymer spinning solutions. Orig. art. has: 4 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 03Mar63

ENCL: 00

SUB CODE: OC, MT

NO REF SOV: 004

OTHER: 000

Card 2/2

VILENSKAYA, Raisa Markovna; FRENKEL', S.Ya., doktor fiz.-mat.
nauk, red.; ALEKSEYEVA, V.P., red.; KUTASOVA, E.I., red.

[High-molecular compounds; bibliographic index of Soviet
and foreign books, 1930-1963] Vysokomolekuliarnye soedine-
niia; bibliograficheskii ukazatel' otechestvennykh i zaru-
beznykh knig 1930-1963. Leningrad, 1965. 368 p.
(MIRA 18:10)

1. Akademiya nauk SSSR. Biblioteka.

L 57054-65/ EWP(j)/EWT(m)/T Pc-4 RM
ACCESSION NO: AP5013977

UR/0183/65/000/003/0002/0007
677.744.72

17
16
8

AUTHORS: Sorokin, A. Ya.; Pyrkov, L. M.; Frenkel', S. Ya.

TITLE: Analysis of certain rheological factors affecting the structure of the PVS fiber

SOURCE: Khimicheskiye volokna, no. 3, 1965, 2-7

TOPIC TAGS: polymer, polymer rheology, polymer chain, polymer property, polyvinyl alcohol, synthetic fiber, synthetic material, fiber deformation, fibrillar structure

ABSTRACT: A series of physico-chemical investigations was carried out to establish relations between the molding conditions, structures, and properties of fiber, and its strength. The experimental microscopic wet molding device simulated with sufficient accuracy actual conditions of commercial plants. The PVS material (polyvinyl alcohol) studied was of definite technological interest. Because maximum fiber strength was obtained with maximum molecular orientation, the radial nonhomogeneity of fiber had to be reduced to a minimum by adjusting the magnitude and the velocity of the spinneret drawing so that the formation of longitudinal nonhomogeneities proceeded faster than radial ones. At greater drawing velocities the emerging fiber

Card 1/4

L 57054-65

ACCESSION NR: AP5013977

was considered to consist of three sections: 1) the part closest to the spinneret-- of almost fluid consistency; 2) the intermediate zone of high elastic coagulation; 3) solidified fiber. The molecular orientation factor in the first two zones was the effective velocity gradient determined by the absolute drawing velocity. Two different orientation procedures described by A. Ziabicki (J. Appl. Polymer. Sci., 2, 4, 24, 1959) were possible in the first two sections: 1) the stretching of the polymer chain net, illustrated in Fig. 1,a on the Enclosure, and 2) the action of velocity field on the polymer thread during its solidification and stretching, shown in Fig. 1,b on the Enclosure. The degree of orientation and macromolecular development along the fiber was determined by the longitudinal velocity gradient and the counteracting relaxation and diffusion processes. According to the experimental results, it was possible to vary mechanical properties of the fiber by changing the velocity gradient. The relation of the longitudinal gradient to mechanical strength of the fiber is shown in Fig. 2 on the Enclosure. The results obtained are explained by the presence of two equally important processes of molecular orientation. The first resembles the auto-orientation in the systems of anisometric colloidal particles, and is related to the hydrodynamic ordering of structural elements formed during the first coagulation stage. The second process is associated with deformational orientation and involves the development of individual chains and ordering of the amorphous sections in the fiber. Orig. art. has: 4 tables and 4 figures.

Card 2/4

L 57054-65

ACCESSION No: AP5013977

ASSOCIATION: IVS AN SSSR . Leningrad (IVS AN SSSR)

SUBMITTED: 09Jun64.

ENCL: 01

SUB CODE: MT

NO REF SOV: 006

OTHER: 010

Card 3/4

BEL'NINEVICH, N.G.; PYRKOV, L.M.; SOROKIN, A.Ya.; FRENKEL', G.Ya.

Orientation draft of polyvinyl alcohol fibers. Khim. volok.
no.5:24-27 '65. (MIRA 18:10)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.

L 40072-66 EWT(m)/EWP(j)/T IJP(c) RM

ACC NR: AP6012417 (A) SOURCE CODE: UR/0183/65/000/006/0022/0026

AUTHOR: Sorokin, A. Ya.; Andreyeva, N. A.; Volkova, L. A.; Kol'tsov, A. I.;
Rudakov, A. P.; Pyrkov, L. M.; Frenkel', S. Ya

ORG: IVS AN SSSR

TITLE: Correlation of structural and mechanical characteristics of
polyvinyl alcohol fibers, Investigation of supermolecular arrangement
in chemical fibers and means of increasing their strength

SOURCE: Khimicheskiye volokna, no. 6, 1965, 22-26

TOPIC TAGS: polyvinyl alcohol, synthetic fiber, polymer structure,
elongation, rupture strength, correlation function, NMR, X ray analysis

ABSTRACT: The structural and mechanical properties of polyvinyl alcohol
fibers were investigated using the range of thermoplasticized stretch
as the controllable variable. Correlation between these properties
was shown. Linear correlation was established between the overall
orientation of the macromolecules in the fiber and orientation of the
crystallites; between rupture strength and maximum relaxation stress, and
also between these values and the reciprocal half-width reflection β^{-1}

Card 1/2

UDC: 677.744.72

L 40072-66

ACC NR: AP6012417

and the amount of elongation (up to 450% elongation tested). It was shown that the parameter (β_{11}) describes the previous history of the samples with respect to macromolecular orientation. NMR studies showed the basic conformation of the polyvinyl alcohol fiber macromolecules is flat trans-zigzag. A combination of different analytical methods (NMR, X-ray, isothermal heating) can be used to study in succession the structure formation processes at different stages of fiber formation. Orig. art. has: 4 equations, 8 figures and 2 tables.

SUB CODE: 07,11/ SUBM DATE: 09Jun64/ ORIG REF: 011/ OTH REF: 003

Card 2/2 11b

L 60263-65 EPF(c)/EMP(j)/EWT(m)/T Pc-4/Pr-4 JAJ/EM

ACCESSION NR: A15013060

UR/0190/65/007/005/0854/0859
678.01:53

AUTHORS: Frenkel', S. Ya.; Volkov, T. I.; Baranov, V. G.; Shaltyko, L. G.

TITLE: Polarization optical method for studying structural transitions in polymeric solutions and films

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 5, 1965, 854-859

TOPIC TAGS: polymer, resin, molecular structure, polarized light, polypropylene, spherulite, fusion kinetics

ABSTRACT: A relatively simple method for studying structural transitions in polymers has been developed. It extends currently available methods based on electron microscopy, x-ray analysis, IR and radio spectroscopy. The new method is based on observation of samples and specimens in polarized light. The installation is shown in Fig. 1 on the Enclosure. The possibilities of the new method are illustrated on four examples: determination of the size of spherulites in polypropylene films, study of fusion kinetics in linear and branched chain polyethylene films, orientation of semicrystalline polyethylene films, and formation of colloids in aqueous solutions of Bombyx mori fibroin. It is suggested that the method should prove

Card 1/3

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ACCESSION NR: AP5013060

useful in the study of appearance and destruction of supermolecular structure in laminar capillary flow, the nature of transition states associated with critical opalescence, as well as in the determination of molecular weight and size of macromolecules. Orig. art. has: 4 graphs and 7 photographs.

ASSOCIATION: Institut vysokomolekulyarnykh soyedineniy, AN SSSR (Institute of High-Molecular Compounds, AN SSSR)

SUBMITTED: 13.1.64

ENCL: 01

SIB CODE: OC, OP

NO REF SOV: 008

OTHER: 007

Card 2/3

L 60263-65

ACCESSION NR: AP5013060

ENCLOSURE: 01

0

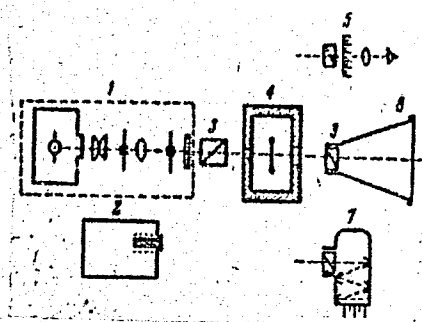


Fig. 1. Schematic of the installation. 1- light source (mercury lamp or laser 2 of type OKG-L-1); 3- polaroids; 4- thermostat; 5- microscope; 6- photogoniometer; 7- photomultiplier

Card 3/3

BARANOV, V.G.; VOLKOV, T.I.; FRENKEL', S.Ya.

Interpretation of the scattering of polarized light by concentrated solutions of polymer films. Vysokom. soed, 7 no.9:1565-1570
S '65. (MIRA 18:10)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR.

FRENKEL', S.Ya.; KUKHAREVA, L.V.; GINZBURG, B.M.; GASPARYAN, K.A.; VOROB'YEV, V.I.

Effect of the load on the transition order-disorder in native collagen fibers. Biofizika 10 no.5:735-742 '65.

(MIRA 18:10)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR, Leningrad i Institut tsitologii AN SSSR, Leningrad.

FRENKEL', S.Ya.; KUKHAREVA, L.V.; GINZBURG, B.M.; VOROB'YEV, V.I.

Free diagram of collagen and the interpretation of the heat of
order-disorder transition in water. Dokl. AN SSSR 165 no.1:149-
152 N '65. (MIRA 18:10)

1. Institut tsitologii AN SSSR i Institut vysokomolekulyarnykh
soyedineniy AN SSSR. Submitted April 29, 1965.

BARANOV, V.G.; VOLKOV, T.I.; FRONKEL', S.Ya.

Polarization-diffractometric study of the formation of a super-molecular structure in a solution of spiral polypeptide. Dokl. AN SSSR 162 no.4:836-838 Je '65. (MIRA 18:5)

1. Institut vysokomolekulyarnykh soyedineniy AN SSSR. Submitted November 24, 1964.

L 37646-66 EMT(m)/EWP(j)/T RM

ACC NR: AP6011237 (A) SOURCE CODE: UR/0413/66/000/006/0075/0075

INVENTOR: Yerusalimskiy, B. L.; Kulevskaya, I. V.; Kamalov, S. K.;
Frenkel', S. Ya.

ORG: none

TITLE: Preparation of polyacrylonitrile.¹ Class 39, No. 179925
[announced by the Institute of High-Molecular Compounds, AN SSSR /y
(Institut vysokomolekulyarnykh soyedineniy AN SSSR)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki,
no. 6, 1966, 75

TOPIC TAGS: polyacrylonitrile, acrylonitrile, polymerization

ABSTRACT: This Author Certificate introduces a method of preparing
polyacrylonitrile by polymerization of acrylonitrile in a hydrocarbon
solvent at about -75C in the presence of organomagnesium catalysts.
To extend the variety of organomagnesium catalysts, complexes of
magnesium alkyl halides or magnesium alkyls with dimethylsulfoxide
are suggested. [LD]

SUB CODE: 11,07/ SUBM DATE: 13Feb65,

Card 1/1 vmb

UDC: 678.745.32

L 23328-66 EWT(m)/EWP(j)/T RM

ACC NR: AP6006982

SOURCE CODE: UR/0190/66/008/002/0278/0281

AUTHORS: Ginzburg, B. M.; Korzhavin, L. N.; Frenkel', S. Ya.; Layus, L. A.; Adrova, N. A. 42

ORG: Institute of High-Molecular Polymers, AN SSSR (Institut vysokomolekulyarnykh soyedineniy AN SSSR) 39 B

TITLE: Crystallinity of poly-2,2'-octamethylene-5,5'-dibenzimidazole 7

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 2, 1966, 278-281

TOPIC TAGS: x ray diffraction study, crystalline polymer/ URS-501 x-ray diffraction apparatus, GUR-3 goniometer 78 10 15 44.6

ABSTRACT: X-ray diffraction study of freshly prepared fibers and films of poly-2,2'-octamethylene-5,5'-dibenzimidazole (I) disclosed a crystalline structure of high order for that polymer, in spite of earlier observations to the contrary by the authors as well as by other workers (A. A. Izyneyev, V. V. Kurashov, V. V. Korshak, T. M. Frunze, and N. Sh. Aldarova. Izv. AN SSSR, Otd. khim. n., 1963, 2019; L. A. Layus, M. I. Bessonov, N. A. Adrova, and M. M. Koton. Plast. massy, 1965, No. 8, 34). The x-ray diffraction study was performed using instrument URS-501 with goniometer GUR-3 adjusted for measurements at small angles. It was established that a 3-hr thermal treatment at 160C results in almost total amorphization of the structure, as can be seen in Fig. 1. However, it also leads to a two-fold rise of tenacity and a

Card 1/2

UDC: 678.01:53+678.6

L 23328..66

ACC NR: AP6006982

I, pulses/sec



Fig. 1. Low angle x-ray diffraction on fibers (meridional direction):
1 - freshly formed;
2 - treated at 160C for 3 hours.

five-fold rise in the elasticity modulus. Relaxation mechanisms and structural processes related to the mobility of the heterocyclic sections of the chain of I, as well as the direct influence of formic acid, are discussed as probable causes of the crystallinity in freshly formed I. The authors express their gratitude to Ye. M. Pokrovskiy and K. K. Kalnyn'sh for taking the IR spectra and to A. I. Slutsker for evaluation of the results. Orig. art. has: 8 figures and 1 formula.

SUB CODE: 07/ ■ SUBM DATE: 15Mar65/

ORIG REF: 007

OTH REF: 003

Card 2/2 PV

L 22492-66 EWT(m)/EWP(j)/T RM

ACC NR: AP6009639

SOURCE CODE: UR/0181/66/003/003/0647/0650

AUTHOR: Ginzburg, B. M.; Sorokin, A. Ya.; Frenkel', S. Ya.

ORG: Institute of Macromolecular Compounds, AN SSSR, Leningrad (Institut vysokomolekulyarnykh soyedineniy AN SSSR)

TITLE: Self-orientation of structural elements during heat treatment of fibers of polyvinyl alcohol₆

SOURCE: Fizika tverdogo tela, v. 8, no. 3, 1966, 647-650

TOPIC TAGS: polyvinyl alcohol, polymer structure, x ray diffraction analysis, organic crystal, crystal orientation

ABSTRACT: This is a continuation of earlier work by one of the authors (Frenkel', DAN SSSR v. 162, 836, 1965) dealing with multistage self-ordering of polymers. In the present study, on the basis of the analogy between solid and liquid states, the authors investigate the increase in the orientation of crystallites, resulting from a short-duration heating of previously oriented freshly formed fibers of polyvinyl alcohol, which do not as yet have high crystallinity. Most earlier experimental studies of orientation at increased temperature were made in the presence of mechanical stretching. The authors studied a fiber of polyvinyl alcohol produced in acetone and subjected to some orientation during the shaping process itself. The crystallite orientation was studied by x-ray diffraction in apparatus in which

Card 1/2

L 22492-66

ACC NR: AF6009639

the sample could be rotated about the axis of the primary beam. X-ray patterns showed that in the freshly formed fiber the crystallites are full of defects and are small in size. After placing the fiber for three minutes in a thermostat heated to 225C (for a temperature close to the melting point), the fiber shrunk by approximately 30%, lost approximately 10% of weight, and the azimuthal half angle dropped from $\sim 17^\circ$ to 12.5° after one minute heating. After three minutes heating the results were ~ 30 , $\sim 34\%$, and 6.5° respectively. The orientation of the crystals is greatly increased, although many extraneous factors make an unambiguous interpretation of the degree of orientation difficult. This was accompanied by a strong shrinking of the fiber, thus evidencing a disorientation of its amorphous part. On the basis of the result the authors advanced the hypothesis that the orientation of the crystallites in the fibers has a thermodynamic character, i.e., the self-orientation of the supermolecular structure elements occurs in the solid phase. Orig. art. has: 3 figures and 1 formula.

SUB CODE: 20,07/ SUBM DATE: 23Jun65/ ORIG REF: 004/ OTH REF: 011

Card 2/2 BK

FRENKEL', V. I.

Changes in the venous blood circulation in the brain in vascular diseases of it. Nauch. trudy Inst. nevr. AMN SSSR no.1:499-511 '60. (MIRA 15:7)

1. Iz psikhonevrologicheskogo instituta imeni Bekhtereva, direktor - prof. V. N. Myasishchev.

(BRAIN--BLOOD SUPPLY)
(CEREBROVASCULAR DISEASE)

BEL'MAN, Kh.L.; LEVIN, G.Z.; BELEN'KAYA, R.M.; SVETLICHNYY, V.A.; FRENKEL',
V.I.

Some current data on the diagnosis of various forms of cerebral
vascular diseases. Trudy Gos. nauch.-issl. psikhonevr. inst. no.20:
311-320 '59. (MIRA 14:1)

1. Gosudarstvennyy nauchno-issledovatel'skiy psikhonevrologicheskiy
institut imeni V.M. Bekhtereva, Leningrad:
(BRAIN—DISEASES)

FRENKEL', V.I.

Algorithmic problems in partly ordered groups. Usp. mat.nauk
17 no.4:173-179 '62. (MIRA 15:8)
(Groups, Theory of)

KAYETANOVICH, M.M., inzh.; KRYLOV, S.V., inzh.; FRENKEL', V.I., inzh.

Bolted strain clamps for overhead power transmission lines. Elek.
sta. 34 no.9:84-85 S '63. (MIRA 16:10)

FRENKEL', V.I.

Effective partial ordering of finitely presented groups. Sib.
mat. zhur. 5 no.3:651-670 My-Je '64. (MIRA 17:6)

FRENKEL', V.I.

Algorithmic problems in partially ordered groups. Dokl. AN SSSR
152 no.1:67-70 S '63. (MIRA 16:9)

1. Predstavleno akademikom P.S.Novikovym.
(Algorithms) (Groups, Theory of)

FRENKEL', V.I.

Insolubility of certain algorithmic problems in groups defined by a
system of generatrices and determining inequalities. Sib. mat. zhur.
6 no.5:1144-1162 S-0 '65. (MIRA 18:10)

FRENKEL', V.I.

Prescribing defining inequalities for partially ordered groups.
Usp. mat. nauk 20 no.6:164-168 N-D '65. (MIRA 18:12)

1. Submitted Aug. 8, 1964.

FRENKEL', V.Kh.

Organization of work and norms of radiation exposure for
personnel engaged in the diagnosis and treatment of thyroid
gland diseases with radioactive iodine. Med.rad. 7 no.11:
23-26 N°62. (MIRA 16:9)

1. Iz kafedry rentgenologii i radiologii (zav. - dotsent A.P.
Burkalov) Kishinevskogo meditsinskogo instituta i Rentgeno-
radiologicheskogo tsentra Respublikanskoy klinicheskoy bol'-
nitsy Moldavskoy SSR.

(THYROID GLAND--DISEASES)

(IODINE ISOTOPES--THERAPEUTIC USE)

(RADIATION--SAFETY MEASURES)

FRENKEL, V.Kh.; BRONSHTEYN, G.A.; KUTSAROV, I.Kh.

Roentgenological diagnosis of splenic echinococcosis. Zdravokhranenie 6 no.3:56-57 My-Je'63 (MIRA 16:11)

1. Iz rentgeno-radiologicheskogo tsentra (zav. - L.Ye. Kishinevskiy) Respublikanskoy klinicheskoy bol'nitsy (glavnyy vrach - T.V.Moshnyaga) i kafedry fakul'tetskoy khirurgii (zav. dotsent N.Kh. Anestiyadi) Kishinevskogo meditsinskogo instituta.

*

1.2000.55 E-1(1)/EST(m)
ACCESSION NR: AP5018573

UR/0241/64/009/012/0028/0032

AUTHOR: Nikberg, N. I.; Frenkel', V. Kh.

TITLE: Problem of radiation hygiene in isotope myelorradiometry

SOURCE: Meditsinskaya radiologiya, v. 9, no. 12, 1964, 28-32

TOPIC TAGS: hygiene, radiation protection, radioisotope, radium, medical personnel

ABSTRACT: The problems of radiation safety for persons who in the course of their activities find themselves in the vicinity of patients in whom Rn^{222} is used for diagnostic purposes are discussed in the article. The problems merit considerable attention for the following reasons:

- a) the isotope Rn^{222} after being introduced into the organism is exhaled into the surrounding medium 2 to 3 hours after its administration;
- b) it has been found also that the concentration of the exhaled isotopes in the air may reach a value which is in excess of that which is considered safe;

Card 1/3

56036-65
ACCESSION NR: AP5018573

c) isotope myelography is for the most part applied in neurosurgical and neurological clinics where the patients are subjected to a number of examinations in which the isotopes are used.

The authors recommend that the following measures be taken to produce maximum radiation safety conditions:

- 1) reduce the number of diagnostic investigations in which the isotopes are used;
- 2) normal procedures are to be carried out no sooner than 2 hours after the completion of the myelography;
- 3) provide maximum ventilation;
- 4) place one patient only in a room after isotope myelography;
- 5) conduct periodic examinations of the concentration of Rn^{222} in the air of the room;
- 6) whenever possible use Xe^{133} instead of Rn^{222} in diagnostic procedures; the former is less radioactive than the latter.

Orig.art. has: 1 table.

Card 2/3

L 56035-65

ACCESSION NO: AP5018573

ASSOCIATION: Moldavskiy institut gigiyeny i epidemiologii i rentgenologicheskoy
tsentr Respublikanskoy klinicheskoy bol'nitsy Moldavskoy SSR (Moldavian Institute
of Hygiene and Epidemiology and Roentgenological Center of the Republic's Clinical
Hospital, Moldavian SSR)

SUBMITTED: 21 Apr 64

ENCL: 00

SUB CODE: LS

NR REF SOV: 009

OTHER: 004

JPRS

ff
Card 3/3

KIROSHKA, M.V.; FRENKEL', V. Kh.

Study of the function of kidneys in urolithiasis using radio-
isotope renography with cardiotrast I^{131} . Trudy Kish. gos.
med. inst. 24:156-170 '64 (MIRA 18:1)

1. Urologicheskaya klinika Kishinevskogo gosudarstvennogo medi-
tsinskogo instituta i rentgentsentr Moldavskoy Respublikanskoy
klinicheskoy bol'nitsy.

YELASHOV, Yu.G.; KOZLOVA, A.V.; LYASH, P.M.; MINKEL'TSVAYG, M.B.;
SINIT'SIN, R.V.; FREINKEL', V.K.

8th All-Union Congress of Roentgenologists and Radiologists.
Med. rad. 10 no.2:80-94 F '65. (MIRA 18:6)

FRENKEL', V.Sh.; KIROSHKA, M.V.

Isotope renography using J^{131} -labelled hippuran and J^{131} -labelled
cardiotrast in urolithiasis. Med. rad. 10 no.9:39-42 S '65.

(MIRA 18:10)

1. Urologicheskaya klinika (zav. - doktor med.nauk S.D.Coligorskiy)
Kishinevskogo meditsinskogo instituta i rentgeno-radiologicheskoy
tsentr (zav. L.Ye.Kishinevskiy) Respublikanskoy klinicheskoy
bol'nitsy Moldavskoy SSR.

Frenkel, V. Ya.

AUTHOR: Frenkel', V. Ya.

57-10-22/33

TITLE: Emissive Properties of Aluminum Oxide at High Temperatures (Iz-luchatel'nyye svoystva okisi alyuminiya pri vysokikh temperaturakh)

PERIODICAL: Zhurnal Tekhn. Fiz., 1957, Vol. 27, Nr 10, pp. 2356-2358 (USSR)

ABSTRACT: The integral emissive coefficient of the alundum (aluminum oxide baked together) are determined here. This serves as a coat for preheater of the electronic valve cathods with indirect glowing in the temperature range of from 1000 to 1600 C. For this purpose the experimental data of the measurement of the thermal conductivity coefficients of the alundum in Zhurnal Tekhn. Fiz., Vol.22 1952,p. 1271, are used and thenot linear differential equation of the thermal conductivity is solved. The integral emissive coefficient of the alundum
$$e_a = \frac{W_a}{W_{s.K.}},$$
 (W_a = the specific emission efficiency of an absolutely black body), is a slowly increasing temperature function as it is shown here. Its amount varies in the above mentioned temperature ranges from circa 0,50 to 0,55. The here described method can be extended to the determination of the integral emissive coefficient of any materials. There are 2 figures and 5 Slavic references.

Card 1/2

Emissive Properties of Aluminum Oxide at High Temperatures.

57-10-22/33

SUBMITTED: April 2, 1957

Card 2/2

AUTHORS: Frenkel', V. Ya., Shepsavol, M. A.

SOV/57-23-7-19/35

TITLE: Equitemperature Cathode With Direct Heating, and a Method of Its Calculation (Ekvitemperaturnyy pryamonakal'nyy katod i metodika yego rascheta)

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1958, Vol. 28, Nr 7, pp.1477-1488 (USSR)

ABSTRACT: The construction of a short cathode with a direct channel and a cross section stepwise changing with length (compound cathode) is discussed. Such a construction secures the maintenance of an equitemperature--(i.e. equi-emission--)-range of the demanded length at the short cathode and it decreases the maximum working temperature in the case of a given rated emission current. Thus the life of the cathode is prolonged. The life is determined by the evaporation of the material used for the cathode which process depends to a great extent on the temperature. The uniform distribution of emission current across the length of the short compound cathode also determines a uniform load of the anode. However, in the case

Card 1/3

Equitemperature Cathode With Direct Heating, and a Method of Its Calculation

SOV/57-29-7-19/35

of a cathode of constant cross section the emission current mainly originates from the central part of the cathode which leads to an overloading of the anode. In the case of a compound cathode of thorium-carbide-tungsten the investigation carried out by L. A. Radchenko, Engineer, showed an increase of the efficiency of the cathode by more than the 10-fold as compared to a homogeneous cathode of the same total length. The author discusses a method of calculation for short compound cathodes of the proposed construction. For this purpose a differential equation is written down and solved. The method is explained by examples. The formulae of calculation are compared to the existing experimental data. The curves given (Fig 3) make it possible in every concrete case to determine the measurements of the cathode and of the amount of the current passing through this cathode; viz. in such a way that the demanded mode of operation of the cathode is secured.

The cathode construction proposed can be used in a number of experiments where always the same temperature of the sample is required. The course of temperature of the investigated function in using a set of compound cathodes can be determined.

Card 2/3

Equitemperature Cathode With Direct Heating, and a Method of Its Calculation ^{SOV/57-28-7-19/35}

The formulae and diagrams given may be used for the exact calculation of cathodes with direct channel and of a cross section that is constant with respect to its length. The calculated data agree with those from the experiments in a satisfactory way. There are 9 figures and 9 references, 4 of which are Soviet.

SUBMITTED: July 12, 1957

1. Cathodes--Design

Card 3/3

FRENKEL', V. Ya., Cand Tech Sci -- (diss) "Thermal calculations of electron tube electrodes." Leningrad, 1960. 14 pp; (Ministry of Higher and Secondary Specialist Education RSFSR, Leningrad Polytechnic Inst im M. I. Kalinin); 150 copies; price not given; bibliography at end of text (13 entries); (KL, 23-60, 125)

S/170/60/003/04/13/027
B007/B102

AUTHOR: Frenkel', V. Ya.

TITLE: Heat Exchange[^] by Radiation Between Two Parallel Infinite Cylinders²⁶

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 4, pp. 85 - 89

TEXT: The aim of the present paper is the determination of the coefficient of heat exchange by radiation between two parallel infinite cylinders. The medium surrounding the cylinder is assumed to have a coefficient of radiation absorption equal to zero, whereas the absorption coefficient of the cylinder to be heated (with index 2) is assumed to be one. The present results are directly generalized also for the case where this coefficient is different from one, but where multiple reflection between the two cylinders can be neglected. The radiation of the "heating" cylinder is distributed in the directions according to the Lambert cosine law. The formulas for the coefficient of heat exchange by radiation between two cylinders are obtained by two methods which are independent of one another. By the first method the amount of energy emitted from a surface element of the first cylinder into the direction of the second cylinder is calculated; formula (1) is

Card 1/2

Heat Exchange by Radiation Between Two
Parallel Infinite Cylinders

S/170/60/003/04/13/027
B007/B102

obtained. In the special case of $R_1 = R_2$ one obtains formula (1.a). In the case of the second method the heat exchange between the arc ACC'A', with the straight lines AB and A'B', and the arc BDD'B' is investigated (Fig. 1); the formulas (2) and (2.a), respectively, are obtained. Formula (2.a) can also be obtained from the formula by Khottel' (Refs. 1, 2). The resulting formulas can be used to calculate the temperature in cylindric tubes which is briefly shown here. The Lyumner law is mentioned. There are 3 figures, and 4 Soviet references. (✓)

ASSOCIATION: Fiziko-tekhnicheskii institut AN SSSR, g. Leningrad (Institute of Physics and Technology of the AS USSR, City of Leningrad)

Card 2/2

85440

S/170/60/003/011/014/016
B019/B056

26.2312

AUTHOR:

Frenkel, V. Ya.

TITLE:

The Influence Exerted by a Nonuniform Load of the Anode
Upon the Temperature Distribution Over Its Entire Contour

PERIODICAL:

Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 11,
pp. 108-112

TEXT: For the investigation of the temperature distribution carried out here, the following scheme is assumed: let a plate have the width $2l_1$, the thickness δ , and let it be infinitely extended in the direction of the y -axis. The power, which is distributed along the z -axis, is constant in sections of the width $2l_1$ and equal to W_1 . In the sections $l - l_1 = l_2$, the power is zero. The author proceeds from the steady equation of thermal conductivity for the central range of the plate (l_1 broad)

AS $\frac{d^2 T_1}{dz^2} = \sigma_a T_1^{n_a} p = W_1$ (1). He then sets up the analogous equation

Card 1/2

85410

The Influence Exerted by a Nonuniform Load S/170/60/003/011/014/016
of the Anode Upon the Temperature Distribution B019/B056
Over Its Entire Contour

for the edge of the plate and gives the boundary conditions. These equations are solved and from studying the solutions the author concludes that for anodes of usual dimensions and made from usual materials the temperature distribution over the anode may be looked upon as constant. The temperature is approximately equal to that at uniformly distributed load. There are 3 figures and 8 references: 5 Soviet, 2 German, and 1 US.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR, g. Leningrad
(Institute of Physics and Technology of the AS USSR,
Leningrad)

SUBMITTED: March 15, 1960

Card 2/2

VOLCHOK, B.A.; FRENKEL', V.Ya.

Some characteristics of zone melting. Fiz.tver.tela 3 no.7:2010-
2013 J1 '61. (MIRA 14:8)

1. Fiziko-tekhnicheskiiy institut imeni A.F.Ioffe AN SSSR,
Leningrad.

(Crystals--Thermal properties) (Diffusion)

VOLCHOK, B.A.; FRENKEL', V.Ya.

Elements of the thermodynamic calculation of the zone-melting
process. Inzh.-fiz.zhur. 4 no.8:43-48 Ag '61. (MIRA 14:8)

1. Fiziko-tekhnicheskiy institut AN SSSR, Leningrad.
(Melting) (Thermodynamics)

BUKHOVOSTOV, A.P.; FRENKEL', V.Ya.

Temperature distribution in round and rectangular plates
cooled by radiation in a vacuum at a given temperature along
the plate's contour. Inzh.-fiz.zhur. 5 no.8:78-80 Ag '62.

(MIRA 15:11)

1. Fiziko-tekhnicheskiy institut AN SSSR imeni A.F.Ioffe,
Leningrad.

(Heat--Radiation and absorption)

24.6610

39497
S/056/62/043/002/040/053
B125/B102

AUTHORS: Bukhvostov, A. P., Frenkel', V. Ya., Shekhter, V. M.
TITLE: Disintegration of a photon into two photons in the nuclear Coulomb field
PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 655 - 660

TEXT: Integrating the differential cross section for the disintegration of an incident low-energy photon into two photons in the nuclear Coulomb field over the angle φ between the planes $(\vec{k}\vec{k}_1)$ and $(\vec{k}\vec{k}_2)$ gives rise to

$$d\sigma = Z^2 \alpha^5 \frac{\omega \omega_1 \omega_2}{4\pi^3 (45m^4)^3} (278Y_1 - 157Y_2) d\omega_1 dx_1 dx_2; \quad (4)$$

Card 1/5 4

Disintegration of a photon into...

S/056/62/043/002/040/053
B125/B102

$$\begin{aligned}
 Y_1 = & -x_1 - x_2 - \frac{1}{2} \left(\frac{\omega_1}{\omega_2} x_1^2 + \frac{\omega_2}{\omega_1} x_2^2 \right) + \left[\left(x_1 + \frac{\omega}{\omega_1} x_2 \right) \left(x_2 + \frac{\omega}{\omega_2} x_1 \right) + \right. \\
 & \left. + \frac{\omega}{\omega_1^2 \omega_2^2} (\omega_1 x_1 + \omega_2 x_2) (\omega_1^2 x_1^2 + \omega_2^2 x_2^2) \right] \omega^{-1/2} - \\
 & - \frac{\omega^3}{2\omega_1^4 \omega_2^4} (\omega_1^2 x_1^2 + \omega_1 \omega_2 x_1 x_2 + \omega_2^2 x_2^2)^2 (\omega_1^2 x_1 + \omega_2^2 x_2 + \omega_1 \omega_2 x_1 x_2) \omega^{-1/2}, \\
 Y_2 = & \frac{\omega_1}{\omega_2} x_1 + \frac{\omega_2}{\omega_1} x_2 - \left[\left(\frac{\omega_1}{\omega_2} x_1 - \frac{\omega_2}{\omega_1} x_2 \right)^2 + \frac{\omega}{\omega_1 \omega_2} x_1 x_2 (\omega_1 x_1 + \omega_2 x_2) \right] \omega^{-1/2}, \\
 \omega = & \left(\frac{\omega_1}{\omega_2} x_1 - \frac{\omega_2}{\omega_1} x_2 \right)^2 + 2 \frac{\omega}{\omega_1 \omega_2} x_1 x_2 (\omega_1 x_1 + \omega_2 x_2).
 \end{aligned} \tag{5}$$

The equation

$$\frac{d\sigma}{dx_1} = \frac{1392^2 \pi^3}{60\pi^3} \frac{\omega^3}{(45m^4)^2} \tag{7}$$

results after integrating the differential cross section over x_2 with

$x_1 = 0$ and integrating again over ω_1 . $x_1 = 1 - \vec{k}\vec{k}_1/\omega\omega_1$;

$x_2 = 1 - \vec{k}\vec{k}_2/\omega\omega_2$; $x = 1 - \vec{k}_1\vec{k}_2/\omega_1\omega_2$. \vec{k} and ω are respectively the

Card 2/84

S/056/62/043/002/040/053
B125/B102

Disintegration of a photon into...

momentum and energy of the incident photon; \vec{k}_1 , \vec{k}_2 and ω_1 , ω_2 are respectively the momenta and energies of the final photons. Numerical integration, absolutely necessary for $x_{1,2}$, gives the angular distribution of one of the final photons with a fixed energy ω_1 when the direction of the other photons after impact is arbitrary (curves 1 to 4 in the Fig.). For small angles, the maximum for $\omega_1 \approx \omega_2$ corresponds to the maximum cross section for small q^2 ($q^2 = (\vec{k}_1 + \vec{k}_2 - \vec{k})^2$). This maximum shows up even more clearly when the momenta of both protons are fixed in direction. Integrating the differential cross section over the energy of the final proton results in the broken curve (5) and integrating this curve over the angle yields

$$\sigma = 12,2 Z^2 \alpha^2 \omega^2 / 4\pi^2 (45 m^4)^2 = 4,65 \cdot 10^{-36} Z^2 (\omega/m)^6 \text{ cm}^2. \quad (8).$$

When $Z = 80$ and $\omega \approx m$ (m = electron mass), the cross section $\sigma \sim 3 \cdot 10^{-32} \text{ cm}^2$ is of the same order of magnitude as the photon-photon scattering cross

Card 3/54

Disintegration of a photon into...

S/056/62/043/002/040/053
B125/B102

section. The above results hold for negligible screening of the nuclear Coulomb field. When $\omega/m \approx 1/137$, the cross section

$$\sigma = \frac{641}{3^{10} 5^3 \pi^4} Z^3 \alpha^4 (\omega a)^4 \frac{\omega^4}{m^8}. \quad (11),$$

obtained by allowing for screening, is equal to $0.41 \cdot 10^{-49} Z^2 \text{cm}^2$. When $\omega \leq 2m$, (8) is 2.5 times larger than the total cross section

$$\sigma \approx \frac{7 \cdot 139 (64 \ln 2 - 23)}{45^3 \cdot 2^9 \cdot \pi^4} Z^3 \alpha^4 \frac{\omega^4}{m^8},$$

calculated by the Weizsäcker-Williams method. For high energies one obtains $\sigma = \kappa (2Z^2 \alpha^5 / \pi m^2) (\ln(\omega/m) - 1)$. There is 1 figure.

ASSOCIATION: Fiziko-tekhnicheskii institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute imeni A. F. Ioffe of the Academy of Sciences USSR)

SUBMITTED: March 13, 1962

Card 4/04

L 10738-65 EWT(1)/EWG(k)/EPA(sp)-2/EPA(w)-2/EEG(t)/T/EEJ(b)-2/EWA(m)-2 Po-h/
 P1-h/ P2-5/Pab-2h IJP(o)/AEDC(b)/ESD(t)/ASD(d)/AFMD(t)/AS(mp)-2/ASD(a)-5/ASD(f)-2/
 ASD(p)-3/ESD(ga)/AFETR/AFWL/RAEM(a)/SSD AT
 S/0057/64/034/010/1752/1763
 ACCESSION NR: AP4046333

AUTHOR: Piliya, A.D.; Frenkel, V.Ya.

AUTHOR: Cyclotron resonance of electrons in a magnetic mirror system. 1. The distribution function

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.10, 1964, 1762-1763

TOPIC TAGS: plasma, magnetic mirror, cyclotron resonance, electromagnetic wave, plasma heating, distribution function

ABSTRACT: The distribution function is calculated for the electrons in a plasma confined in an axially symmetric system between two magnetic mirrors while it is heated by electromagnetic waves at the electron Larmor frequency, incident axially from beyond the mirror. Resonance between the incident electromagnetic waves and the electron Larmor frequency is assumed to occur only in the region of the mirrors. Collisions are neglected, and the drift approximation is employed except in the immediate vicinity of the mirrors. The total kinetic energy and the ratio of the transverse kinetic energy to the magnetic field strength are accordingly adiabatic invariants and change only during reflection when resonance obtains. The changes in

L 10738-65

ACCESSION NR: AP4046333

these quantities during reflection are calculated by solving the equations of motion in the lowest order of the ratio of the electron Larmor radius to L , the length characterizing the inhomogeneity of the field, and the result of this calculation is employed in the kinetic equation as a collision term. The kinetic equation is solved for the time dependent distribution function under two different conditions: first, under the assumption that the electrons are initially cold and their number remains constant, and second, under the assumption that the supply of cold electrons is continually replenished by ionization of the neutral component of the plasma. In the second case, although the problem remains essentially a non-stationary one, a pseudostationary condition arises in which the distribution function becomes time independent for velocities less than a certain ever increasing value. No suitable experimental data are available with which to compare the present theory. The following numerical values are presented as an example: if the electric field strength of the incident waves is 500 V/cm, the density of neutral hydrogen atoms is 10^{10} cm⁻³, the Larmor frequency is 10^{10} cycle/sec, and $L = 10$ cm, then the average electron energy (in the pseudostationary condition) is 300 eV, and the time characteristic of the process (the mean time required for an electron to produce another by ionizing a hydrogen atom) is 7.9×10^{-3} sec. Orig.art.has: 87 formulas and 1 figure

2/3

L 10738-65

ACCESSION NR: AP4046333

ASSOCIATION: Fiziko-tekhnicheskiy institut im.A.F.Ioffe AN SSSR, Leningrad (Physico-technical Institute, AN SSSR)

SUBMITTED: 26Dec63

ENCL: 00

SUB CODE: ME

NR REF SOV: 002

OTHER: 002

3/3

L 10739-65 EWT(1)/EWG(k)/EPA(sp)-2/EPA(w)-2/EEC(t)/T/EEC(b)-2/EWA(m)-2 Po-4/
 P1-4/Pz-6/Pab-24 IJP(c)/ASD(a)-5/AFWL/ASD(p)-3/ASD(f)-2/ESD(t)/AS(wp)-2/AFETR/
 RAEM(a)/ESD/AEDC(b)/AFMD(t)/SSD/ESD(gs)/ASD(d) AT
 ACCESSION NR: AP4046334 8/0057/64/034/010/1764/1768

AUTHOR: Piliya, A.D.; Frenkel', V.Ya.

TITLE: Cyclotron resonance of electrons in a magnetic mirror system. 2. Penetration of the high frequency field into the plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.10, 1964, 1764-1768

TOPIC TAGS: plasma, cyclotron resonance, magnetic mirror, electromagnetic wave reflections

ABSTRACT: The reflection coefficient is calculated for circularly polarized electromagnetic waves incident axially on one magnetic mirror of an axially symmetric two-mirror trap confining a plasma. The frequency of the waves is assumed to be equal to the electron Larmor frequency in the region of the mirror, and the electric vector is assumed to rotate in the same direction as the electrons. The calculation was undertaken because of its relevance to the problem of heating confined plasmas. The authors employ the electron distribution function which they derived in the preceding paper (ZhTF, 34, 1752, 1964; see Abstract AP4046333), and they also adopt without redefinition some of the notation of that paper. The calculation is

1/2

L 10739-55
ACCESSION NR: AP4046334

relatively straightforward, and it is found that the intensity of the rf field within the plasma decreases with time as the mean electron energy increases, and particularly, in case there is a neutral component of the plasma to provide a continuous supply of cold electrons, as the electron density increases. In case the mean electron energy is 300 eV, the length characterizing the inhomogeneity of the magnetic field is 10 cm, and the electron Larmor frequency is 10^{10} cycle/sec, the ratio of the rf field strength within the plasma to that without it will decrease by a factor 2 at an electron density of $2.3 \times 10^9 \text{ cm}^{-3}$. Orig.art.has: 25 formulas.

ASSOCIATION: Fiziki-tekhnicheskiy institut im.A.F.Ioffe AN SSSR, Leningrad (Physico-technical Institute, AN SSSR)

SUBMITTED: 03Jan64

ENCL: 00

SUB CODE: ME

NR REF SOV: 001

OTHER: 000

2/2

ACC NR: AP 001316

SOURCE CODE: UR/0057/66/036/012/2190/2194

AUTHOR: Piliya, A.D.; Fronkel', V.Ya.

ORG: Physicotechnical Institute im. A.F.Ioffe, AN SSSR, Leningrad (Fiziko-
tekhnicheskiy institut AN SSSR)

TITLE: X-radiation at the electron cyclotron resonance in a magnetic trap

SOURCE: Zhurnal tekhicheskoy fiziki, v. 36, no. 12, 1966, 2190-2194

TOPIC TAGS: plasma confinement, plasma heating, cyclotron resonance, magnetic trap,
x ray emission

ABSTRACT: The authors calculate the intensity of x-rays due to the electrons of a plasma confined in a magnetic trap striking the wall of the chamber during heating of the plasma by a high frequency field at the electron cyclotron frequency. The calculation is based on a differential equation for the electron velocity distribution function derived elsewhere by the authors (ZhTF, 34, No.10, 1752, 1964). This differential equation is integrated under the appropriate boundary conditions with the aid of some simplifying assumptions, and there is derived an approximate expression for the x-ray intensity as a function of the time since the high frequency field was turned on. For a plasma of finite thickness (or with a finite penetration depth of the high frequency field), the x-ray intensity passes through a maximum as a function of time, owing to depletion of the plasma of electrons. For an infinitely thick plasma

Card 1/2

UDC: 533.9

ACC NR: AP 7001316

this maximum is masked as a result of the strong dependence of the x-ray intensity on the electron velocity. The theoretical curve is compared with an experimental curve of x-ray intensity versus time, and qualitative agreement is shown. The authors thank V. Ye. Golant, M.M. Novik, and K.A. Podushnikova for their interest in the work and for discussions. Orig. art. has: 13 formulas and 2 figures.

SUB CODE: 20

SUBM DATE: 09Jul66

ORIG. REF: 003

OTH REF: 002

Card- 2/2

FRENKEL, Yr.

Frenkel, Yanny. Criteria of bicompactness and of H -completeness in an accessible topological Fréchet-Riesz space. *Ciencia y Técnica* 107, 383-401 (1946). (Spanish)

The author characterizes bicompact spaces in terms of the intersection properties of various types of families of sets. A typical one, in terms of open sets, follows. Let a family \mathcal{U} of open sets be called a T_1 -system if (a) $V_1, \dots, V_n \in \mathcal{U}$ implies $V_1 \cap \dots \cap V_n$ is not void; (b) if an arbitrary set A fails to meet some $V \in \mathcal{U}$ then A has a neighborhood $W \supset A$ whose complement meets every $V \in \mathcal{U}$. Then a T_1 -space X is bicompact if and only if for every maximal T_1 -system which is also a dual ideal there is a point common to all its members.

R. Arens (Princeton, N. J.)

Source: *Mathematical Reviews*, Vol. 8, No. 5

ASHKINAZI, A.L., kandidat tekhnicheskikh nauk, dotsent; FRENKEL', Ya. I.,
inzhener.

Co-operative effort to increase the efficiency of the heat-power
system in machine-building plants. Trudy LIEI no.7:69-80 '54.
(Forging machinery) (MIRA 9:9)

MICHURINA, K.I., kandidat tekhnicheskikh nauk, dotsent; FRENKEL', Ya.I.,
inzhener; CHAYCHUK, A.Ya., inzhener; ROGOV, B.M., inzhener; BRAVERMAN,
D.A., inzhener.

Co-operative effort to increase the efficiency of the heat supply
system in machinery-manufacturing plants. Trudy LIEI no.7:80-96 '54.
(Heat engineering) (MIRA 9:9)

GOLYAND, S.M.; FRENKEL', Ya.I.; BAROCHINA, B.Ya.; ZABRODIN, B.G.

Removal of hydrogen sulfide from the exhaust air in viscose manufacture by means of an alkaline solution in a Venturi tube. Khim. volok. no.2:49-52 '60. (MIRA 13:12)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut promyshlennoy i sanitarnoy oчитki gazov (for Golyand, Frenkel'). 2. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (for Barochina). 3. Kalininskiy kombinat (for Zabrodin).
(Viscose) (Hydrogen sulfide)

FRENKEL', Yakov Isaakovich; ASHKINAZI, A.L., red.

[Ways of saving electric power for the production of
compressed air in piston compressors] Puti ekonomii
elektroenergii dlia proizvodstva szhatogo vozdukha v
porshnevykh kompressorakh. Leningrad, 1965. 29 p.
(MIRA 18:7)

S/880/61/000/079/011/011
E194/E455

AUTHORS: Gerasimovich, T.V., Kirianaki, N.V., Frenkel', Ya.N.
TITLE: Digital indicator lamps
SOURCE: Lvov. Politekhnichnyy institut. Nauchnyye zapiski.
no.79. Voprosy elektroizmoritel'noy tekhniki. no.1.
1961. 258-261

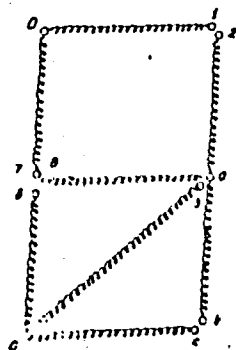
TEXT: Digital instruments often need indicator lamps which will display numbers from 0 to 9. A lamp may contain configurated filaments but they are then at different levels and the angle of vision becomes restricted. In the lamp described, eight straight filaments form two conjoined squares with a diagonal filament running across the lower square from its top right hand corner (Fig.3). By appropriate combinations of these filaments numbers from 0 to 9 can be built up. The filaments are all of the same length and in the same plane so that all the figures are of equal brightness and the angle of vision is wide. The main disadvantage is the complicated connections. There are 4 figures.

Card 1/2

Digital indicator lamps

S/380/61/000/079/011/611
E194/E455

Fig. 3.



Card 2/2.

~~SECRET! Y. [unclear]~~

In the struggle for advanced technology. Elek.i topl.'iaga
no.8:5-^a Ag '57. (ELRA 10:8)

1.Nachal'nik Moskovskogo elektromekhanicheskogo remontnogo zavoda
Ministerstva puty soobshchaniya.
(Electric railroads--Maintenance and repair)

FRENKEL', Ye.B.

Improving the quality of electric machines. Zhel.-dor.transp. 45 no.12:
29-32 D '63. (MIRA 17:2)

1. Nachal'nik Moskovskogo elektromekhanicheskogo remontnogo zavoda
Ministerstva putey soobshcheniya.

FRANKEL, I. A., NEDELITSKAYA, Y. A.

Hides and Skins

Effect of rolling off operations on the shrinkage of sheepskin. Leg, prom., No.3, 1952.

Monthly List of Russian accessions, Library of Congress, June 1952. Unclassified.

FRENKEL', Ye.B., kandidat tekhnicheskikh nauk; SERGEYEV, N.V.

Moistening sheepskins for coats in a flow of mixed steam and air.
Leg. prom. 16 no.1:28-29 Ja '56. (MLRA 9:6)
(Hides and skins)

FRENKEL', Ye.B., kand. tekhn. nauk; KHMEL'NITSKAYA, Ye.G., mladshiy nauchnyy
sotrudnik; SHAKHET, G.A., inzh.

Moisturing fur skins by steam-air mixture. Leg. prom. 18 no.5:35-36
My '58. (MIRA 11:6)

(Fur--Dressing and dyeing)